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(71)Applicant : JUKI CORP

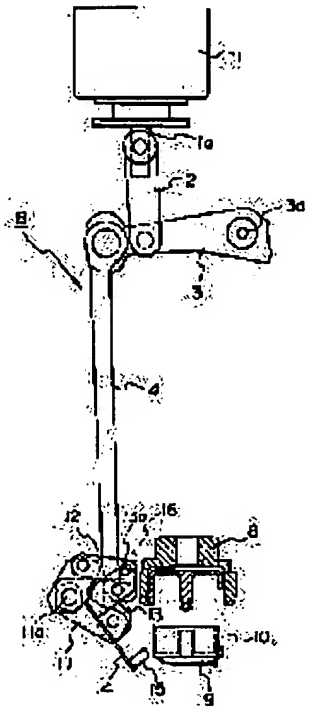
(72)Inventor : OKUBO KEN

(54) PICKER OF SEWING MACHINE

(57)Abstract:

PROBLEM TO BE SOLVED: Not to obstruct the displacement of bobbins by forcing a picker operated at the time of automatically cutting a thread to retreat from the front of a bobbin during the non-operation.

SOLUTION: The picker 15 is connected to a center link 13 through a picker plate 14 and moved in rotation by the rotation of the center link 13. The center link 13 is connected to a freely rotatable picker arm 11 through an intermediate link 12, and rotated at a larger angle of rotation than the picker arm 11. The picker arm 11 is connected to a solenoid 1 through a picker link 4, a base link 3 and a solenoid link 2. When the picker arm 11 is a little rotated according to the operation of the solenoid 1, the picker 15 is largely rotated. Accordingly, during the non-operation, the picker 15 can be forced to retreat to a position separated from the front of a bobbin 10 without any increase in the moving distance of the plunger 1a of the solenoid 1.



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CLAIMS

[Claim(s)]
[Claim 1] In the sewing machine which has the picker which contacts the bobbin contained by the iron pot on the occasion of the thread cutter by this automatic thread-cutter equipment while having automatic thread-cutter equipment The driving means which has the actuator which is picker equipment of the sewing machine to which the above-mentioned picker is moved, and reciprocates in the predetermined range, The first body of revolution which is connected with the above-mentioned actuator through a link mechanism, and changes a reciprocating motion of the above-mentioned actuator into rotation, and is rotated, The second body of revolution which rotates the above-mentioned picker before the location where the above-mentioned picker contacts the above-mentioned bobbin from the location which does not lap with the above-mentioned bobbin with which the above-mentioned picker was connected, and it saw from the transverse plane of the above-mentioned iron pot, and the above-mentioned picker was contained by the above-mentioned iron pot, Picker equipment of the sewing machine which carries out the connection transfer of the first body of revolution of the above, and the upper second body of revolution, and is characterized by coming to provide an angle-of-rotation magnification means to amplify output angle of rotation to an input angle of rotation.
[Claim 2] The above-mentioned angle-of-rotation magnification means is picker equipment according to claim 1 characterized by coming to connect the first body of revolution and second body of revolution by the link piece, and the distance from the connection location of the above-mentioned link piece and the second body of revolution to the center of rotation of the second body of revolution being short from the distance from the connection location of the above-mentioned link piece and the first body of revolution to the center of rotation of the first body of revolution.
[Claim 3] The second body of revolution of the above and the above-mentioned picker are picker equipment according to claim 1 or 2 characterized by being joined through the flat spring which energizes the above-mentioned picker to the above-mentioned bobbin side when this picker contacts the above-mentioned bobbin.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the picker equipment of the sewing machine which prevents reservation of the die length of the needle thread left behind to the needle side at the time of a thread cutter, and racing of the bobbin at the time of a thread cutter in the sewing machine which has automatic thread-cutter equipment.
[0002]
[Description of the Prior Art] Generally, in the sewing machine which has automatic thread-cutter equipment, after a series of sewing actuation is completed, based on directions of an operator, a needle thread and a bobbin thread are cut automatically. In this case, although automatic thread-cutter equipment will cut a needle thread and a bobbin thread between the iron pot of a sewing machine, and a needle, after cutting short the needle thread in the condition that the needle hole let it pass, the needle thread may have fallen out from the needle hole by raising of the balance at the time of the next sewing actuation initiation.
[0003] Moreover, although it changed into the condition that faced cutting a needle thread and a bobbin thread and the needle thread and the bobbin thread were pulled, the bobbin may have idled with the inertia force as if a bobbin thread is pulled out from a bobbin in this case, the bobbin thread may have changed into the condition of having been pulled out by the excess from the bobbin, and the bobbin thread pulled out by the excess may have been involved in the bobbin, the shuttle bobbin case, etc.
[0004] Then, in the sewing machine which has automatic thread-cutter equipment, in case a needle thread and a bobbin thread are cut, it moves to a shuttle-bobbin-case side from the front side of a shuttle bobbin case, and the picker equipment which has the picker to which a head contacts a bobbin through the notching section of a shuttle bobbin case is formed. And the above-mentioned picker equipment prevents racing of a bobbin by making a picker contact a bobbin as mentioned above at the time of the thread cutter by automatic thread-cutter equipment.
[0005] Moreover, picker equipment adjusts the die length from the needle hole of the needle thread which remains in a needle side to the margin of string, when this needle thread is hooked on the picker in the condition contacted the bobbin when the needle thread in the condition of turning around the bobbin by the iron pot separates from an iron pot, the die length of the thread guide of the needle thread from a needle hole to the cutting location by automatic thread-cutter equipment is increased at the time of yarn cutting and a needle thread is cut.
[0006] As shown in drawing 3 and drawing 4 , conventionally the above-mentioned picker equipment A The solenoid 1 which drives picker equipment A, and the solenoid link 2 connected with plunger 1a of this solenoid 1, The base link 3 connected with this solenoid link 2 (only an important section is illustrated), It consists of a KO character-like peaker shaft 6 joined to the picker arm 5 and this picker arm 5 of the shape of L character connected with the picker link 4 connected with one edge of this base link 3, and this picker link 4, and a tubed picker 7 connected to the point of this picker shaft 6.
[0007] The above-mentioned solenoid link 2 transmits the reciprocating motion of plunger 1a of a

solenoid 1 to the base link 3. The above-mentioned base link 3 is supported by supporting-point 3a free [a revolution], and is rotated focusing on supporting-point 3a by transmitting the reciprocating motion of a solenoid 1 to one edge through the above-mentioned solenoid link 2.
[0008] And in one edge of the base link 3, rather than the connection location with the solenoid link 2, one edge of the picker link 4 is connected with one end, and rotation of the base link 3 is again changed into the reciprocating motion of the picker link 4. In addition, the other-end section which the base link 3 does not illustrate is connected with automatic thread-cutter equipment (graphic display abbreviation). That is, the reciprocating motion of plunger 1a of a solenoid 1 is distributed by the base link 3, it interlocks and picker equipment A and automatic thread-cutter equipment are operated.
[0009] Although the above-mentioned automatic thread-cutter equipment is equipment which cuts a needle thread and a bobbin thread by operating ** Metz which is not illustrated When retreat of plunger 1a of a solenoid 1 is transmitted through the above-mentioned base link 3, the koro which is not illustrated for operating ** Metz is forced, and engages with the cam (grooved cam) which was prepared in **** which rotates an iron pot 8, and which is not illustrated and which is not illustrated.
[0010] And when the koro engages with a cam as mentioned above (i.e., when a picker 7 contacts the bobbin 10 in a shuttle bobbin case 9 so that it may mention later by retreat of plunger 1a of a solenoid 1), ** Metz operates corresponding to a revolution of an iron pot 8. As for the above-mentioned picker link 4, the other-end section is connected with the center section of the picker arm 5. The above-mentioned picker arm 5 is formed in the shape of L character, and the edge of one of these is supported by supporting-point 5a free [a revolution].
[0011] Therefore, the picker arm 5 is rotated focusing on supporting-point 5a, when the picker link 4 reciprocates. Moreover, one edge of the KO character-like picker shaft 6 is joined to the other-end section of the picker arm 5. In addition, one edge of the picker shaft 6 is in the condition of having been bound tight and fixed to the other-end section side of the picker arm 5, by loosening bolting, the drawer of one edge of the picker shaft 6 becomes free to the other-end section of the picker arm 5, and the die length which the another side edge of the picker arm 5 and one edge of a picker shaft overlap can be adjusted now.
[0012] Moreover, the other-end section of the picker shaft 6 is formed thinly, and is in the condition of having been inserted in the above-mentioned tubed picker 7 from other parts, it is in this condition and the picker 7 is connected to the another side edge of the picker shaft 6 free [sliding].
[0013] Therefore, the above-mentioned picker arm 5, the picker shaft 6, and the picker 7 are formed so that it may rotate to one focusing on supporting-point 5a, and when advance retreat of plunger 1a of a solenoid 1 is transmitted through the solenoid link 2, the base link 3, and the picker link 4, a picker 7 rotates. Moreover, when coil spring (it illustrates to drawing 4) 7a is built in the picker 7 interior and a picker 7 is pushed back, a picker 7 is energized ahead.
[0014] Moreover, as shown in the migration part of the above-mentioned picker 7 at drawing 3 and drawing 4 , while an iron pot 8 is arranged, as shown in drawing 4 , the shuttle bobbin case 9 and the bobbin 10 are set to the iron pot 8. And after plunger 1a of a solenoid 1 has moved forward, as shown in drawing 3 , a picker 7 rotates back and it is in the condition that the picker 7 and the bobbin 10 separated.
[0015] Moreover, after plunger 1a of a solenoid 1 has retreated, as shown in drawing 4 , a picker 7 rotates ahead, a picker 7 is arranged to bobbin flange 10a of a bobbin 10 at a right angle, and the head of a picker 7 is in the condition of having contacted bobbin flange 10a through the notching section (graphic display abbreviation) of a shuttle bobbin case 9. And in the condition which showed in drawing 4 , it is in the condition that the revolution of a bobbin 10 was controlled because the head of a picker 7 contacts bobbin flange 10a.
[0016] In addition, since the picker 7 is connected through coil spring 7a to the picker shaft 6 in this case, the strength which forces a picker 7 on a bobbin 10 can be changed by using coil spring 7a which has a different spring constant. That is, a picker 7 does not inhibit a revolution of a bobbin 10 thoroughly, prevents racing of a bobbin 10 to the last, and it is in the condition to which the picker 7 contacted the bobbin 10, a bobbin 10 needs to rotate so that a bobbin thread may be pulled out, when the

bobbin thread wound around the bobbin 10 is pulled, and it adjusts the strength which forces a picker 7 on a bobbin 10 by coil spring 7a as mentioned above.
[0017] Moreover, it is also possible to adjust the strength which the location of a picker 7 is moved forward or retreated, and forces a picker 7 on a bobbin 10 by adjusting the overlapping die length of the other-end section of the picker arm 5, and one edge of the picker shaft 7 as mentioned above. And a sewing machine is operated, and in the phase in which the needle thread turned to the periphery of an iron pot 8, if the head of a picker 7 is made to contact bobbin flange 10a, the needle thread from which it separates from an iron pot 8 will be caught in a picker 7. And die length from the needle hole of the yarn which remained in the after [cutting] needle side to the margin of string can be made longer than the case where a picker 7 is not used, by cutting the side sewn in by the cloth which should carry out sewing of the needle thread in the condition of having been caught in the picker 7.
[0018]
[Problem(s) to be Solved by the Invention] By the way, in the above-mentioned picker equipment A, the picker 7 is in the condition of having separated from the iron pot 8 as shown in drawing 3 , when it is not used only at the time of cutting of yarn and does not cut yarn. However, it is in the condition that the picker 7 separated from the iron pot 8 and that the picker 7 has been arranged at the abbreviation front of an iron pot 8 although it is a condition, as [show / in drawing 3]. And in an iron pot 8, a bobbin 10 and a shuttle bobbin case 9 are removed from an iron pot for the supplement of a bobbin thread, and it replaces with the bobbin 10 whose yarn was almost lost, and although a bobbin thread will set again to an iron pot 8 the bobbin 10 and shuttle bobbin case 9 which were fully rolled, the above-mentioned picker 7 arranged as mentioned above at the abbreviation front of an iron pot 8 serves as a failure.
[0019] In addition, although a picker 7 is avoided comparatively easily and a failure can exchange the above bobbins 10 in an iron pot 8 if it gets used The arrangement location of the above-mentioned iron pot 8 or a picker 7 is the narrow space under the sewing-machine bed of the lower part of a sewing machine. an exchange of a bobbin sake -- a hand -- the location of an iron pot 8 -- **** -- it is difficult to look into the part of an iron pot 8 in the condition of having said, and the workability in the condition that usually became the activity of groping and the picker 7 has been arranged is not good.
[0020] Furthermore, it is necessary to exchange frequently the bobbin 10 which wound the bobbin thread, and automation of exchange of the time-consuming bobbin 10 as mentioned above is attained by the sewing machine of industrial use. and the case where automation of bobbin exchange is attained -- above -- a picker 7 -- an iron pot 8 -- if arranged mostly at the front, while being unable to pull out straightly a bobbin 10 and a shuttle bobbin case 9 in accordance with iron pot shaft orientations (an alternate long and short dash line a illustrates to drawing 3), but complicated actuation being needed and automation becoming difficult, big cost starts automation.
[0021] In addition, various factors can be considered to the reason the above-mentioned picker 7 is in the condition of having been arranged at the front of an iron pot 8 at the time of intact. First, in case a reciprocating motion is usually changed into rotation by the link mechanism, angle of rotation of the side changed into rotation is made into the small thing so that the force may generally be enough transmitted in consideration of the vector of the force. Therefore, in conventional picker equipment A, since the picker 7 is rotated with small angle of rotation to supporting-point 5a, the picker 7 is in the condition of having remained in the transverse plane of an iron pot 8, at the time of intact.
[0022] Moreover, when they will serve as the shape of U almost longwise character if the picker arm 5, the picker shaft 6, and a picker 7 are seen on the whole, the vector of the above-mentioned force is disregarded, these are rotated at a big include angle focusing on supporting-point 5a and a picker 7 is eliminated from the transverse plane of an iron pot 8, the back of the picker shaft 6 will extend greatly on the left-hand side in drawing rather than supporting-point 5a. In this case, since picker equipment A is arranged as mentioned above in the space where it was restricted under the sewing-machine bed, possibility that the back of the picker shaft 6 will collide with a certain member is high, and cannot move a picker 7 with big angle of rotation.
[0023] That in addition, the configuration where the picker arm 5, the picker shaft 6, and the picker 7 were doubled is the shape of U longwise character While coil spring 7a is built in a picker 7 and the

picker 7 serves as a comparatively long configuration In the joint of the picker arm 5 and the picker shaft 6, it is because the edge of the way connected to the picker arm 5 of the picker shaft 6 was made into the comparatively long configuration by considering as the configuration which can adjust the amount of extension of a picker.

[0024] Moreover, as an approach of enlarging angle of rotation of a picker 7, how to enlarge movement magnitude of plunger 1a of a solenoid 1 can be considered, for example, without changing the configuration of conventional picker equipment A greatly. However, as mentioned above, in order for a solenoid 1 not to drive picker equipment A and to interlock automatic thread-cutter equipment with picker equipment A, the other-end section which the base link 3 does not illustrate is connected with automatic thread-cutter equipment. Therefore, since the need of changing a design comes not only out of picker equipment A but out of the configuration of automatic thread-cutter equipment when increasing the movement magnitude of plunger 1a of a solenoid 1, the cost concerning a design change may increase.

[0025] This invention is made in view of the above-mentioned situation, and aims at offering the picker equipment of the sewing machine which can eliminate only the part of the above-mentioned picker from the transverse plane of an iron pot at the time of intact of this picker, without breaking down linkage with the present automatic thread-cutter equipment.

[0026]

[Means for Solving the Problem] The picker equipment of the sewing machine of this invention according to claim 1 In the sewing machine which has the picker which contacts the bobbin contained by the iron pot on the occasion of the thread cutter by this automatic thread-cutter equipment while having automatic thread-cutter equipment The driving means which has the actuator which is for moving the above-mentioned picker and reciprocates in the predetermined range, The first body of revolution which is connected with the above-mentioned actuator through a link mechanism, and changes a reciprocating motion of the above-mentioned actuator into rotation, and is rotated, The second body of revolution which rotates the above-mentioned picker before the location where the above-mentioned picker contacts the above-mentioned bobbin from the location which does not lap with the above-mentioned bobbin with which the above-mentioned picker was connected, and it saw from the transverse plane of the above-mentioned iron pot, and the above-mentioned picker was contained by the above-mentioned iron pot, The connection transfer of the first body of revolution of the above, and the upper second body of revolution was carried out, and it made into the solution means of the above-mentioned technical problem coming to provide an angle-of-rotation magnification means to amplify output angle of rotation to an input angle of rotation.

[0027] Namely, by rotating the above-mentioned picker before the location where the above-mentioned picker contacts the above-mentioned bobbin from the location where the second body of revolution does not lap with the above-mentioned bobbin with which it saw from the transverse plane of the above-mentioned iron pot, and the above-mentioned picker was contained by the above-mentioned iron pot Since it can shunt to the location which does not lap a picker with an iron pot when the picker is not in contact with a bobbin, on the occasion of exchange of a bobbin, a picker does not become obstructive and exchange of a bobbin can be made easy.

[0028] Furthermore, since it has shunted to the location where it faces automating exchange of a bobbin and a picker does not lap with a bobbin, it becomes possible to pull out a bobbin and a shuttle bobbin case linearly from an iron pot, and automation of attachment and detachment of a bobbin and a shuttle bobbin case can be made easy. Moreover, although it will rotate with bigger angle of rotation than before, a picker If angle of rotation of the first body of revolution is made into the same thing as angle of rotation of the conventional picker, and abbreviation and it is made to make big as mentioned above the second angle of rotation which rotates a picker with an angle-of-rotation magnification means It becomes possible to make it rotate to the location which contacts the above-mentioned bobbin from the location which does not lap with the above-mentioned bobbin which looked at the picker from the transverse plane of the above-mentioned iron pot as mentioned above, and was contained by the above-mentioned iron pot, without changing the configuration of the reciprocating motion range of an actuator,

or the above-mentioned link mechanism. The conventional thing can be used for the automatic thread-cutter equipment which is interlocked with the above-mentioned driving means and operates as it is.
[0029] That is, in picker equipment and automatic thread-cutter equipment, the angle of rotation can be enlarged on the occasion of the rotation of a picker, without carrying out the design change of a driving means, a link mechanism, and the automatic thread-cutter equipment. In addition, although the above-mentioned driving means is a solenoid fundamentally and an actuator is the plunger of a solenoid, you may make it use other cylinder equipments etc.
[0030] Moreover, the above-mentioned link mechanism transmits a reciprocating motion of an actuator to the first body of revolution, and the first body of revolution should just be rotated. Moreover, in the above-mentioned link mechanism, it is desirable to have the distribution frame which distributes a reciprocating motion of an actuator to a picker and automatic thread-cutter equipment so that automatic thread-cutter equipment may be interlocked by the driving means with a picker.
[0031] moreover, the above-mentioned angle-of-rotation magnification means as that to which the first body of revolution and second body of revolution are transmitted with a belt The path of the pulley of the driving side of the first body of revolution as what was made larger than the path of the pulley of the target of the second body of revolution, and a thing to which the first body of revolution and second body of revolution are transmitted by the gear The first body of revolution and second body of revolution can be connected by the link piece so that it may mention later, and it can consider as what made the path of the gear by the side of the first body of revolution larger than the path of the gear of the second body of revolution, and the thing transmitted by the link. Moreover, when using a gear as an angle-of-rotation magnification means, since the first and the second body of revolution do not rotate 360 degrees or more, it is not necessary to make a gear into the shape of a circle, and a flabellate form gear can be used.
[0032] The picker equipment of the sewing machine of this invention according to claim 2 It comes to connect the above-mentioned angle-of-rotation magnification means the first body of revolution and second body of revolution by the link piece. From the distance from the connection location of the above-mentioned link piece and the first body of revolution to the center of rotation of the first body of revolution, it made for the direction of the distance from the connection location of the above-mentioned link piece and the second body of revolution to the center of rotation of the second body of revolution to be short into the solution means of the above-mentioned technical problem.
[0033] That is, since the angle-of-rotation magnification means is a thing using a link and even a picker can be constituted from a solenoid as one link mechanism through the first and the second body of revolution, picker equipment can be manufactured comparatively easily. It made into the solution means of the above-mentioned technical problem to join the picker equipment of the sewing machine of this invention according to claim 3 through the flat spring to which the second body of revolution of the above and the above-mentioned picker energize the above-mentioned picker to the above-mentioned bobbin side when this picker contacts the above-mentioned bobbin.
[0034] Like before, the die length of a picker becomes long by using a coil spring, when a coil spring adjusts the thrust of a picker to a bobbin, and when a picker is supported possible [a rotation] and it is made to move, the space which the member which supports a picker and a picker occupies at the time of a rotation becomes large.
[0035] Therefore, it is difficult to amplify angle of rotation as mentioned above, to see a picker from the transverse plane of the above-mentioned iron pot as mentioned above, and for possibility that the member supported possible [a rotation of a picker and a picker] will collide with other members of a sewing machine when it is made to rotate from the location which does not lap with the above-mentioned bobbin contained by the above-mentioned iron pot to the location which contacts the above-mentioned bobbin to become high, and to rotate a picker with big angle of rotation.
[0036] However, since the die length of the picker itself can be shortened by joining a picker to the second body of revolution through a flat spring as mentioned above, it becomes possible in the limited space to rotate a picker with bigger angle of rotation.
[0037]

[Embodiment of the Invention] Below, an example of the gestalt of operation of this invention is explained with reference to a drawing. Drawing 1 and drawing 2 show the picker equipment B of an example of the gestalt of this operation. In addition, the picker equipment B in an example of the gestalt of this operation improves some conventional picker equipments A shown in drawing 3 and drawing 4 , attaches the sign same about the same component as conventional picker equipment A, and omits that explanation.

[0038] As shown in drawing 1 and drawing 2 , the picker equipment B of the gestalt of this operation The solenoid 1 (driving means) which drives picker equipment B, and the solenoid link 2 connected with plunger 1a (actuator) of this solenoid 1, The base link 3 connected with this solenoid link 2 (only an important section is illustrated), The picker link 4 connected with one edge of this base link 3, and the picker arm 11 (the first body of revolution) of the shape of L character connected with this picker link 4, The intermediate link 12 (link piece) connected with this picker arm 11, It consists of the center link 13 (the second body of revolution) connected with this intermediate link 12, the picker plate 14 (flat spring) joined by this center link 13, a picker 15 of the shape of a rod joined to the picker plate 14, and a picker support plate 16 supported for a center link 13, enabling a free revolution.

[0039] What has the above-mentioned solenoid 1, the solenoid link 2, the base link (only an important section is illustrated) 3, and the picker link 4 be [the same as that of the picker equipment shown in the above-mentioned conventional example] it is used. Therefore, in the sewing machine using this picker equipment, the completely same automatic thread-cutter equipment as usual can be used now as automatic thread-cutter equipment connected with the other-end section side which the base link 3 does not illustrate.

[0040] Moreover, the link mechanism rotated so that the above-mentioned solenoid link 2, the base link (only an important section is illustrated) 3, and the picker link 4 may transmit the reciprocating motion of plunger 1a of a solenoid 1 to the picker arm 11 and may mention the picker arm 11 later is constituted.

[0041] And the picker link 4 is connected with one edge of the picker arm 11, and the intermediate link 12 is connected with the other-end section. As mentioned above, since the straight core is set to supporting-point 11a while the picker arm 11 is made into the shape of L character, in drawing 1 , migration of the almost upper and lower sides in the picker link 4 is changed into migration of almost right and left in an intermediate link 12 by minding the picker arm 11.

[0042] Moreover, rather than the distance to the connection location of the picker link 4 of one edge of the picker arm 11 from supporting-point 11a, since distance to the connection location of the intermediate link 12 of the other-end section of the picker arm 11 from supporting-point 11a is shortened, on the occasion of transmission of an intermediate link 12, movement magnitude decreases by the picker arm 11 from the picker link 4, and the force is amplified by the lever rule.

[0043] The edge of one of these is connected with the picker arm 11 as mentioned above, and, as for the above-mentioned intermediate link 12, the other-end section is connected with the center link 13. Moreover, the above-mentioned center link 13 is in the condition of having been supported by supporting-point 13a free [rotation]. In addition, supporting-point 13a is in the condition of having been supported by the picker support plate 16 fixed to supporting-point 11a which supports the picker arm 11.

[0044] The edge of one of these is joined by the center link 13, and the above-mentioned picker plate 14 rotates to a center link 13 and one focusing on supporting-point 13a. Moreover, when a picker 15 contacts bobbin flange 10a of a bobbin 10 so that it may mention later, while the above-mentioned picker plate 14 serves as a flat spring formed in thin tabular one, and inhibiting racing of a bobbin 10 The thrust to bobbin flange 10a of a picker 15 is adjusted to extent which a bobbin 10 rotates when the bobbin thread wound around the bobbin 10 is lengthened. With the driving force of a solenoid 1 A picker 15 stops a revolution of a bobbin 10 thoroughly.

[0045] And it is joined to the other-end section of the picker plate 14 by the right angle to the picker plate 14, and the above-mentioned picker 15 is rotated focusing on the above-mentioned supporting-point 13a to the above-mentioned center link 13 and the picker plate 14, and one. Moreover, a picker 15

has the die length which escapes from the notching section of a shuttle bobbin case 9 near the front face of a shuttle bobbin case 9, and contacts bobbin flange 10a at least.
[0046] Moreover, since a picker 15 adjusts the above-mentioned thrust to a bobbin 10 not with a coil spring but with the picker plate 14 which is a flat spring Since the straight-line-like picker plate 14 is supporting the direct picker while being able to shorten a picker 15 comparatively Since there is no big supporter material of occupancy space in the back of a picker 15, even if it rotates a picker 15, the picker plate 14, and a center link 13 with comparatively big angle of rotation (for example, 90 degrees or more) A picker 15, the picker plate 14, and a center link 13 do not turn to the left-hand side in drawing from supporting-point 11a, other members of a sewing machine are collided with, and a revolution of a picker 15, the picker plate 14, and a center link 13 is not checked.
[0047] The location of the above-mentioned supporting-point 13a is arranged near the upper iron pot 8 in drawing 1 and drawing 2 more slightly than the side face of the bobbin 10 bottom contained by the iron pot 8. Furthermore, the head of the above-mentioned picker 15 When a line parallel to the picker plate 14 is both drawn as if radially met from supporting-point 13a When rotating a center link 13 so that it may become bobbin flange 10a of a bobbin 10 and parallel which were arranged back more slightly than the above-mentioned line, and were contained by the iron pot 8 in the picker plate 14, a picker 15 contacts a right angle mostly on the side face of a bobbin 10.
[0048] Moreover, the distance from supporting-point 13a of a center link 13 to the connection location of a center link 13 and an intermediate link 12 is shorter than the distance from supporting-point 11a of the picker arm 11 to the connection location of the picker arm 11 and an intermediate link 12. Therefore, when the picker arm 11 rotates based on migration of plunger 1a of a solenoid 1 and a center link 13 rotates through an intermediate link 12 based on this revolution, angle of rotation of a center link 13 becomes larger than angle of rotation of the picker arm 11, and an intermediate link 12 functions as an angle-of-rotation magnification means.
[0049] By amplifying angle of rotation in this way, moreover, a center link 13, the picker plate 14, and a picker 15 From the location where the head of a picker 15 contacts the bottom side face on the drawing of a bobbin 10 (bobbin flange 10a) as shown in drawing 2 , as shown in drawing 1 When a bobbin 10 and a shuttle bobbin case 9 are pulled out in accordance with the shaft orientations (it sets to drawing 1 and drawing 2 , and is the vertical direction) of an iron pot 8, it rotates to the location where a bobbin 10 and a shuttle bobbin case 9, and a picker 15 do not contact.
[0050] Moreover, as mentioned above, that migration of the almost upper and lower sides in the picker link 4 is changed into migration of almost right and left in an intermediate link 12 in drawing 1 by the picker arm 11, and by arranging supporting-point 13a between supporting-point 11a and an iron pot 8, angle of rotation of the picker arm 11 can be amplified, it can transmit to a center link 13, and the device in which a picker 15 is rotated with big angle of rotation can be made very compact.
[0051] Next, it attaches and explains to an operation of the picker equipment which has the above configurations. First, in case yarn is cut in a sewing machine, as shown in drawing 2 , the head of a picker 15 will be in the condition of having passed through notching section 9a of a shuttle bobbin case 9, and having contacted bobbin flange 10a [on the other hand / (drawing Nakashita side)] of a bobbin 10. That is, plunger 1a of a solenoid 1 retreats, the picker link 4 moves to the method of drawing Nakagami through the solenoid link 2 and the base link 3, an intermediate link 12 RLC[in drawing]-moves [the picker arm 11] to the left in drawing focusing on supporting-point 11a, and a center link 13, the picker plate 14 of one, and a picker 15 RLC[in drawing]-rotate [a center link 13] focusing on supporting-point 13a. And bobbin flange 10a and the picker plate 14 will be in the condition (it sets all over drawing and is an almost level condition) of having been arranged mostly at parallel, and a picker 15 will contact the bobbin flange 10 contained by the iron pot 8 at an abbreviation right angle.
[0052] In this case, it will be transmitted to the automatic thread-cutter equipment which retreat of plunger 1a does not illustrate by the base link 3, and automatic thread-cutter equipment will be in an operating state. Moreover, since angle of rotation is amplified as mentioned above when the revolution of the picker arm 11 is transmitted to a center link 13 by the intermediate link 12, it will rotate with angle of rotation with a bigger center link 13 than the picker arm 11. Moreover, although picker 15 head

is in the condition of having pressed bobbin flange 10a, by retreat of plunger 1a by the solenoid 1 Since the picker plate 14 serves as a flat spring which has elasticity as mentioned above While making the impact to a bobbin 10 into a small thing when the picker plate 14 which is a flat spring bends even if a picker 15 is strongly forced in a bobbin 10 by the force of a solenoid 1 When a bobbin thread is lengthened in a bobbin 10, the energization force of a flat spring is resisted and a bobbin 10 rotates.
[0053] In addition, the condition that the picker 15 shown in drawing 2 contacted the bobbin 10 is in the condition that the picker 15 separated from the bobbin 10 as it was maintained only while cutting yarn and it is small, and usually shown in drawing 1 . Next, in a sewing machine, in case cutting of yarn finishes and it returns to the usual condition, as shown in drawing 1 , plunger 1a of a solenoid 1 extends and the picker link 4 moves caudad through the solenoid link 2 and the base link 3. Moreover, the automatic thread-cutter equipment connected to the other-end section which the base link 3 does not illustrate in this case will be in the condition that actuation was canceled.
[0054] And the picker arm 11 connected with the picker link 4 carries out a drawing Nakamigi revolution a core [supporting-point 11a] because the picker link 4 moves caudad. And the intermediate link 12 connected with the picker arm 11 moves in the direction of drawing Nakamigi by the RRC of the picker arm 11. And when an intermediate link 12 moves in the direction of drawing Nakamigi, the center link 13 connected with the intermediate link 12 carries out a RRC a core [supporting-point 13a].
[0055] In this case, the angle of rotation of a center link 13 becomes large rather than angle of rotation of the picker arm 11. Therefore, the movement magnitude of plunger 1a in the solenoid 1 of conventional picker equipment A, Since angle of rotation of a picker 15 can be enlarged without changing size, a link ratio, etc. of the solenoid link 2, the base link 3, and the picker link 4 Since the conventional components can be used as it is, without changing the design of the automatic thread-cutter equipment interlocked with a solenoid 1, the above-mentioned solenoid 1, the solenoid link 2, the base link 3, and the picker link 4 It becomes possible to hold down in the minimum the cost concerning a design change, the plant-and-equipment investment which takes for picker equipment B in early stages of manufacture.
[0056] And the picker plate 14 joined by the center link 13 and the picker 15 joined to the picker plate 14 can arrange a picker 15 in the location which does not become the obstacle of the bobbin 10 and shuttle bobbin case 9 which are detached and attached in accordance with iron pot shaft orientations from an iron pot 8, as it rotates to a center link 13 and one and is shown in drawing 2 . Moreover, when the picker 15 has been arranged in the above-mentioned location, the center link 13, the picker plate 14, and the picker 15 are arranged rather than supporting-point 11a of the picker arm 11 at the iron pot 8 side. Moreover, since it does not project greatly in the opposite hand of an iron pot 8 from the location of supporting-point 11a only by exceeding slightly an intermediate link 12 and the picker arm 11 from the core of supporting-point 11a to the opposite hand of an iron pot 8, the revolution of the big include angle of a picker 15 is not controlled like before by the member around picker equipment A.
[0057] Therefore, a picker 15 will not be in the condition of a bobbin 10 of having been arranged mostly at the front, in the usual condition except the time of a thread cutter like before. Since it is in the condition which the picker 15 shunted to the location which does not contact a bobbin 10 and a shuttle bobbin case 9 when the straight drawer of a bobbin 10 and the shuttle bobbin case 9 is carried out from an iron pot 8 Attachment and detachment of a bobbin 10 and a shuttle bobbin case 9 will become easy, and the supplement of a bobbin thread will become easy in the sewing machine which has picker equipment B.
[0058] Moreover, since it is not necessary to avoid a picker 15, and to detach and attach a bobbin 10 and a shuttle bobbin case 9 from an iron pot 8 on the occasion of automation of attachment and detachment of a bobbin 10 and a shuttle bobbin case 9, with a comparatively easy configuration, it becomes possible to develop the equipment which performs attachment and detachment of a bobbin 10 and a shuttle bobbin case 9, and automation can be made easy.
[0059]
[Effect of the Invention] According to the picker equipment of the sewing machine of this invention according to claim 1, the second body of revolution By rotating the above-mentioned picker before the

location where the above-mentioned picker contacts the above-mentioned bobbin from the location which does not lap with the above-mentioned bobbin with which it saw from the transverse plane of the above-mentioned iron pot, and the above-mentioned picker was contained by the above-mentioned iron pot Since it can shunt to the location which does not lap a picker with a bobbin when the picker is not in contact with a bobbin, while a picker does not become obstructive and making exchange of a bobbin easy on the occasion of exchange of a bobbin, automation of exchange of a bobbin can be made easy.
[0060] Moreover, although it will rotate with bigger angle of rotation than before, a picker If angle of rotation of the first body of revolution is made into the same thing as angle of rotation of the conventional picker, and abbreviation and it is made to make big as mentioned above the second angle of rotation which rotates a picker with an angle-of-rotation magnification means It becomes possible to make it rotate to the location which contacts the above-mentioned bobbin from the location which does not lap with the above-mentioned bobbin which looked at the picker from the transverse plane of the above-mentioned iron pot as mentioned above, and was contained by the above-mentioned iron pot, without changing the configuration of the reciprocating motion range of an actuator, or the above-mentioned link mechanism. The conventional thing can be used for the automatic thread-cutter equipment which is interlocked with the above-mentioned driving means and operates as it is.
[0061] Since according to the picker equipment of the sewing machine of this invention according to claim 2 the above-mentioned angle-of-rotation magnification means is a thing using a link and even a picker can be constituted from a solenoid as one link mechanism through the first and the second body of revolution, the picker equipment which has the same effectiveness as the configuration of the claim 1 above-mentioned publication can be manufactured comparatively easily.
[0062] According to the picker equipment of the sewing machine of this invention according to claim 3, since the die length of the picker itself can be made shorter than the picker using the conventional coil spring, it becomes possible in the limited space to rotate a picker with bigger angle of rotation.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the top view showing the picker equipment of an example of the gestalt of operation of this invention.
[Drawing 2] It is the top view showing the above-mentioned picker equipment.
[Drawing 3] It is the top view showing conventional picker equipment.
[Drawing 4] It is the top view showing conventional picker equipment.
[Description of Notations]
B Picker equipment
1 Solenoid (Driving Means)
1a The plunger of a solenoid (actuator)
2 Solenoid Link (Link Mechanism)
3 Base Link (Link Mechanism)
4 Picker Link (Link Mechanism)
8 Iron Pot
9 Shuttle Bobbin Case
10 Bobbin
10a Bobbin flange
11 Picker Arm (First Body of Revolution)
12 Intermediate Link (Link Piece, Angle-of-Rotation Magnification Means)
13 Center Link
14 Picker Plate (Flat Spring)
15 Picker

[Translation done.]

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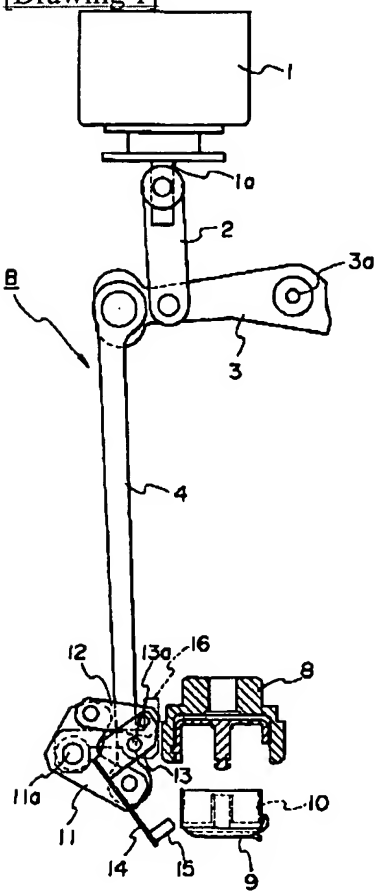
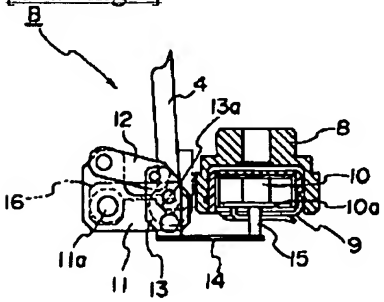
DRAWINGS

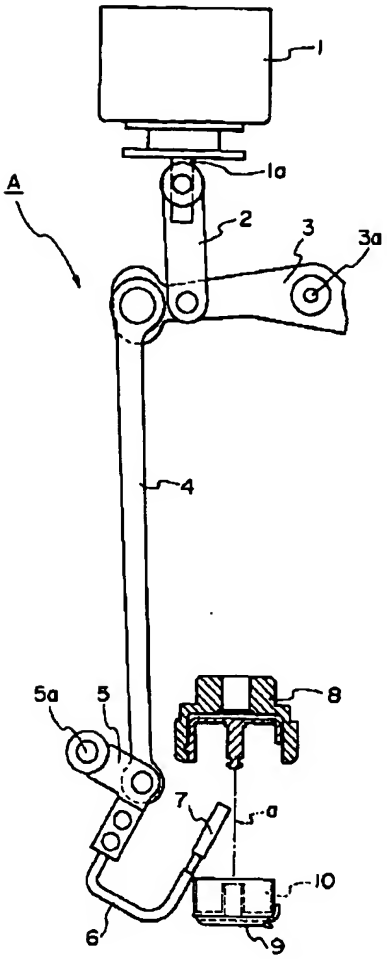
[Drawing 1]



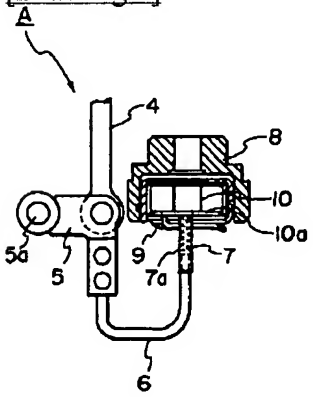
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]